



Six Sigma DMAIC Improvement Story

BLACK BELT Project Objective:
To Increase the Percentage of Time
Routine Calls-for-Service
30-Minute Response Time is Met

Team: *The Innovators*

Lourdes Avalos (Team Lead)

Cpt. Mirtha Ramos

Cpt. Miguel Hernandez, Hammocks District

Cpt. Nizam Ishmael, Northside District

Lisette Reyes-Wilcox, MDPD Admin/Fiscal

Ray Scher, OMB

Cara Tuzeo, OMB

Director J. D. Patterson(Sponsor)



Lean Six Sigma Problem Solving Process

The team utilized the 5-Step DMAIC problem solving process.

DMAIC Performance Improvement Process

Process Step		Description of Team Activities
Number	Name	
1	DEFINE	<ul style="list-style-type: none">• Select Problem• Identify Project Charter• Develop Project Timeline• Establish Method to Monitor Team Progress• Construct Process Flowchart• Develop Data Collection Plan• Display Indicator Performance "Gap"
2	MEASURE	<ul style="list-style-type: none">• Stratify Problem (i.e. "Gap")• Identify Problem Statement
3	ANALYZE	<ul style="list-style-type: none">• Identify Potential Root Cause(s)• Verify Root Cause(s)
4	IMPROVE	<ul style="list-style-type: none">• Identify and Select Improvement(s)• Identify Barriers and Aids• Develop and Implement Improvement Plan• Confirm Improvement Results
5	CONTROL	<ul style="list-style-type: none">• Standardize Improvements within Operations• Implement Process Control System (PCS)• Document Lessons Learned• Identify Future Plans



Identify Project Charter

The team developed a Project Charter.



Project Charter		
Business Case	Project Name:	To increase the % of Time Routine Calls are Responded to within 30 minutes. 1 <input checked="" type="checkbox"/>
	Problem/Impact:	It is thought that the number of uniformed police officers available is insufficient to the number of calls for service per district. Perhaps the real problem is not an insufficient number, rather the allocation of officers per division/districts. The imbalanced workload affects the quality of service delivered, and ultimately the overall safety of our community. 2 <input checked="" type="checkbox"/>
	Expected Benefits:	A better allocation of uniformed police officers available to deliver service as needed and to maintain the overall safety of our community.
Objectives	Outcome Indicator(s)	Q2-Percentage of Time Routine Calls for Service Response Time of 30 minutes is met.
	Proposed Target(s)	Target= 78% (a 1/3 improvement in the Gap)
	Time Frame:	August 2013 thru January 2014
	Strategic Alignment:	Supports the County's Business Plan
Scope	In Scope:	UMSA Police Calls for Service (emergency and non-emergency calls); North and South Divisions only.
	Out-of-Scope:	All Other Jurisdictions
	Authorized by:	Director J.D. Patterson
Team	Sponsor:	Director J.D. Patterson
	Team Leader:	Lourdes Avalos
	Team Members:	Captain Nizam Ishmael, Captain Miguel Hernandez, Captain Mirtha Ramos, Lisette Reyes-Wilcox, Ray Scher and Cara Tuzeo.
	Process Owner(s):	J.D. Patterson







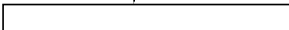

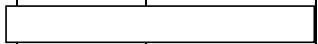

Develop Project Timeline Plan



The team developed a timeline plan to complete the Project.

Legend:	
	= Actual
	= Proposed

WHAT: Complete DMAIC Story Project by January 31, 2014

DMAIC Story Process Step	WHEN								
	2013					2014			
	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April
Define									
			Completed 10/15/13						
Measure									
				Completed 10/24/13					
Analyze									
				Completed 12/17/13					
Improve									
							Completed _____		
Control									
							Completed _____		

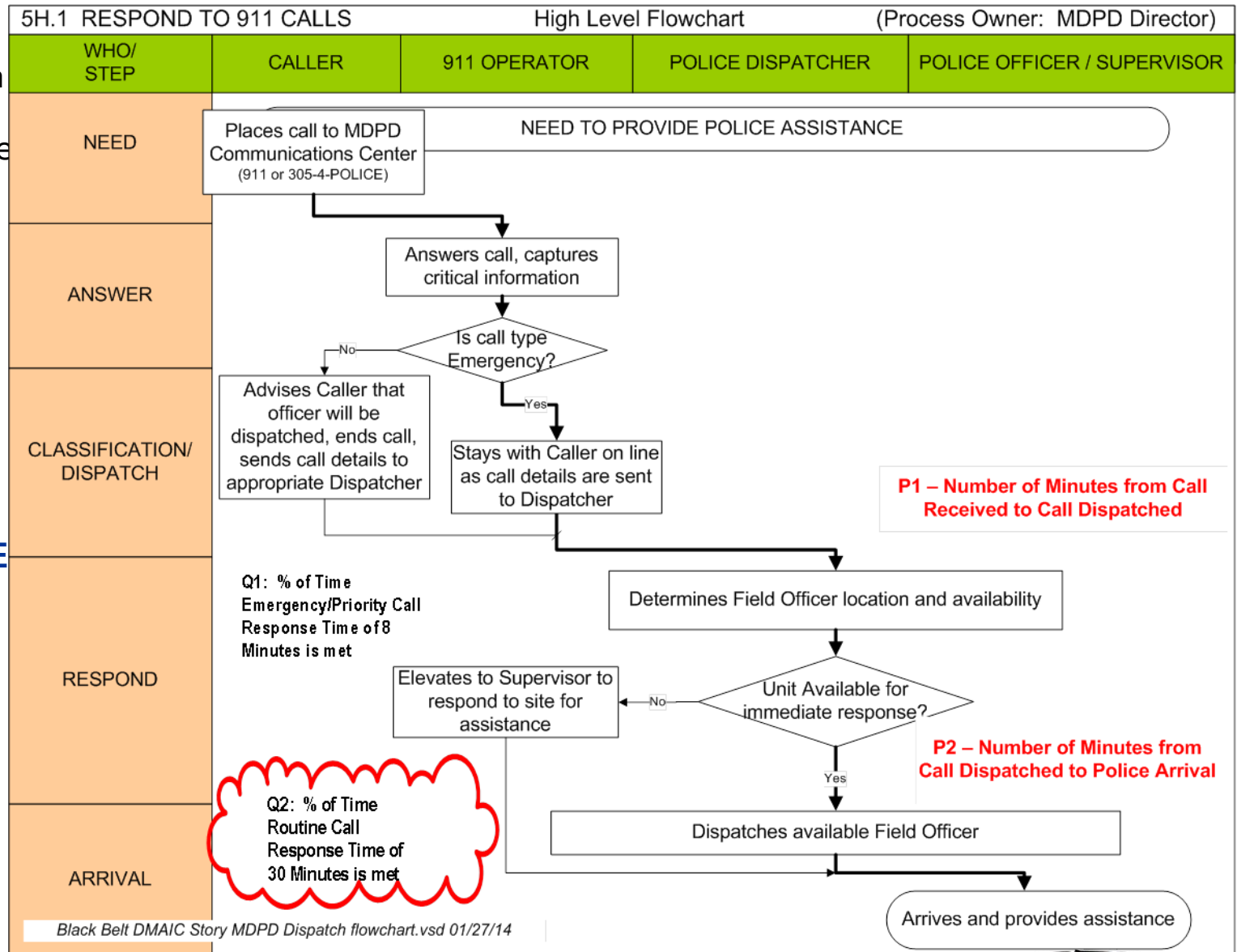
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Review Process Flow Chart

The team constructed a flow chart describing the Process.

BECAUSE THE HANDLING OF ROUTINE CALLS IS MORE REFLECTIVE OF AVERAGE STAFFING, THE TEAM AGREED TO STUDY Q2 FOR THIS PROJECT.



The team next captured the current status on a graph.



Hidden Factors of Delayed Response Time:

Staff considered hidden factors involved with a delayed Response Time to a Routine Call-for-Service:

- Increased risk of danger to Victim(s) *by escalating circumstances*
- Increased risk of citizen property damage
- Increased chance of criminal evading capture (*disturbed crime scene*)
- Increased Dept. Liability
- Institution/Agency Reputation (*ins./accreditation scores*)

Versus:

Officer Safety

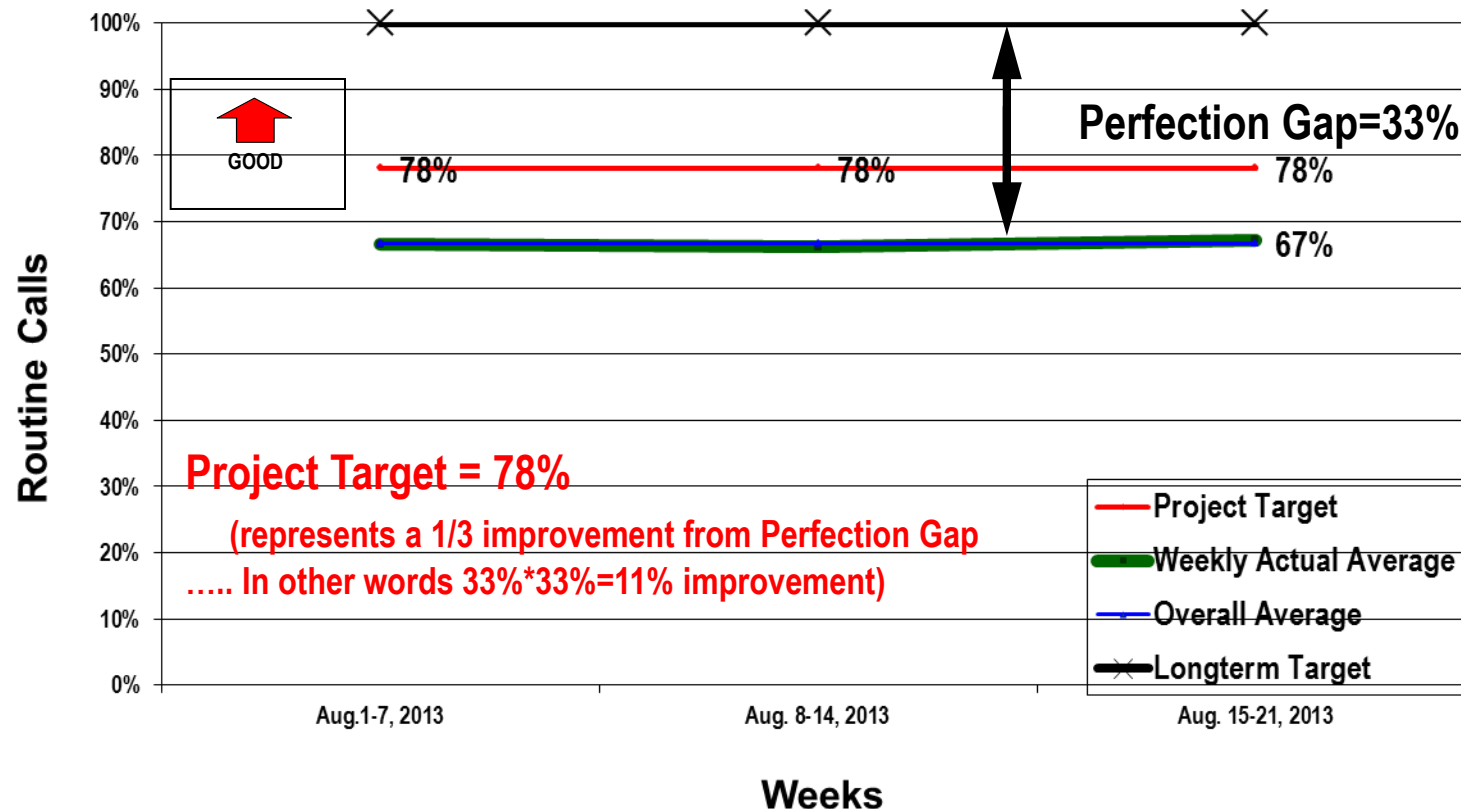


Review Selected Indicator

3, 6, 7 

The team collected Q2 indicator data and reviewed performance trends:

Q2 - % of Time Routine Call Response Time of 30 Minutes is met



Next, the team looked closer at how to capture indicator data.



Identify Data Collection Needs

5 ✓

The team developed a data collection spreadsheet and inserted 33,243 call details covering a 3-week period.



MIAMI DADE POLICE DEPARTMENT ADHOC - Calls-For-Service Detail MDPD

Report Aug 1, 2013 - Aug 21, 2013



District Code	Event Number	Case Number	Complaint Datetime	Military time	Call Complaint Create HMS	Compl Oper Hold Time	Dispatch Call Recvd Time	Call Dispatch[ed] Time	Dispatch Seconds HMS	Intake + Dispatched Minutes	Total Dispatched Time in seconds	Travel Dispatch Officer Time	First Arrival Datetime	Total response time	Total response time In Seconds (30mins.=1,800secs.)
South	PD130810517459	PD130810295028	8/10/2013 10:39:20 PM	22	10:39:20 PM	0:00:43	10:40:03 PM	11:04:44 PM	0:24:41	0:25:24	1524	0:05:02	11:08:38 PM	0:30:26	1826
Midwest	PD130807508578	PD130807289877	8/7/2013 6:59:39 AM	6	6:59:39 AM	0:01:38	7:01:17 AM	7:01:55 AM	0:00:38	0:02:16	136	0:28:10	7:03:05 AM	0:30:26	1826
Midwest	PD130816531062	PD130816302706	8/16/2013 7:06:08 PM	19	7:06:08 PM	0:04:48	7:10:56 PM	7:22:16 PM	0:11:20	0:16:08	968	0:14:18	7:36:54 PM	0:30:26	1826
Hammocks	PD130803501535	PD130803285851	8/3/2013 11:36:20 PM	23	11:36:20 PM	0:00:00	11:36:20 PM	11:53:24 PM	0:17:04	0:17:04	1024	0:13:22	12:06:46 AM	0:30:26	1826
Kendall	PD130808511455	PD130808291552	8/8/2013 12:06:14 PM	12	12:06:14 PM	0:01:06	12:07:20 PM	12:10:46 PM	0:03:26	0:04:32	272	0:25:54	12:36:44 PM	0:30:26	1826
South	PD130821542880	PD130821309047	8/21/2013 3:16:12 PM	15	3:16:12 PM	0:00:06	3:16:18 PM	3:32:51 PM	0:16:33	0:16:39	999	0:13:48	3:46:39 PM	0:30:27	1827

Handle First Arrival	Call Complete Time HMS	Call Complete Datetime	Sig Cd	Signal Desc	Sig Prefix	Sig Suffix	Prim Unit	Sec Unit	Grid Code	Area	Quad	Rpt Y/N	Call complete time seconds (solely for sampling)
0:09:24	23:17:49	11:17:49 PM	14	CONDUCT INVESTIGATION		14	C3301	C3302	2410	3	4	N	49
0:40:50	08:10:55	8:10:55 AM	26	BURGLARY		26V	D2104		4298	1	3	Y	55
0:15:08	19:51:42	7:51:42 PM	14	CONDUCT INVESTIGATION		14	D3101		5009	1	2	N	42
0:14:47	00:21:33	12:21:33 AM	25	BURGLAR ALARM RINGING		25A	H7911	H7913	1777	3	4	Y	33
0:50:55	13:27:35	1:27:35 PM	17	TRAFFIC ACCIDENT		17	K2201	H2280	1952	2	1	Y	35
0:15:13	16:01:52	4:01:52 PM	14	CONDUCT INVESTIGATION		14	C3202		0000		0	N	52
0:19:18	17:37:45	5:37:45 PM	18	HIT AND RUN		18	D3380		1524	2	4	Y	45
0:51:44	19:02:11	7:02:11 PM	17	TRAFFIC ACCIDENT		17	K3205		1952	2	1	Y	11
2:50:26	05:35:39	5:35:39 AM	29	ROBBERY		29	H1307	H1306	1817	3	4	Y	39
1:10:37	09:18:31	9:18:31 AM	20	TRAFFIC DETAIL		20	D2203	D2200	1344	2	1	N	31
0:01:00	16:41:42	4:41:42 PM	34	DISTURBANCE		34	C3100		2538	2	4	N	42
0:04:32	19:37:42	7:37:42 PM	20	TRAFFIC DETAIL		20	C3280		2513	2	1	N	42

Next, the team began to study the call details.

Define Measure Analyze Improve Control

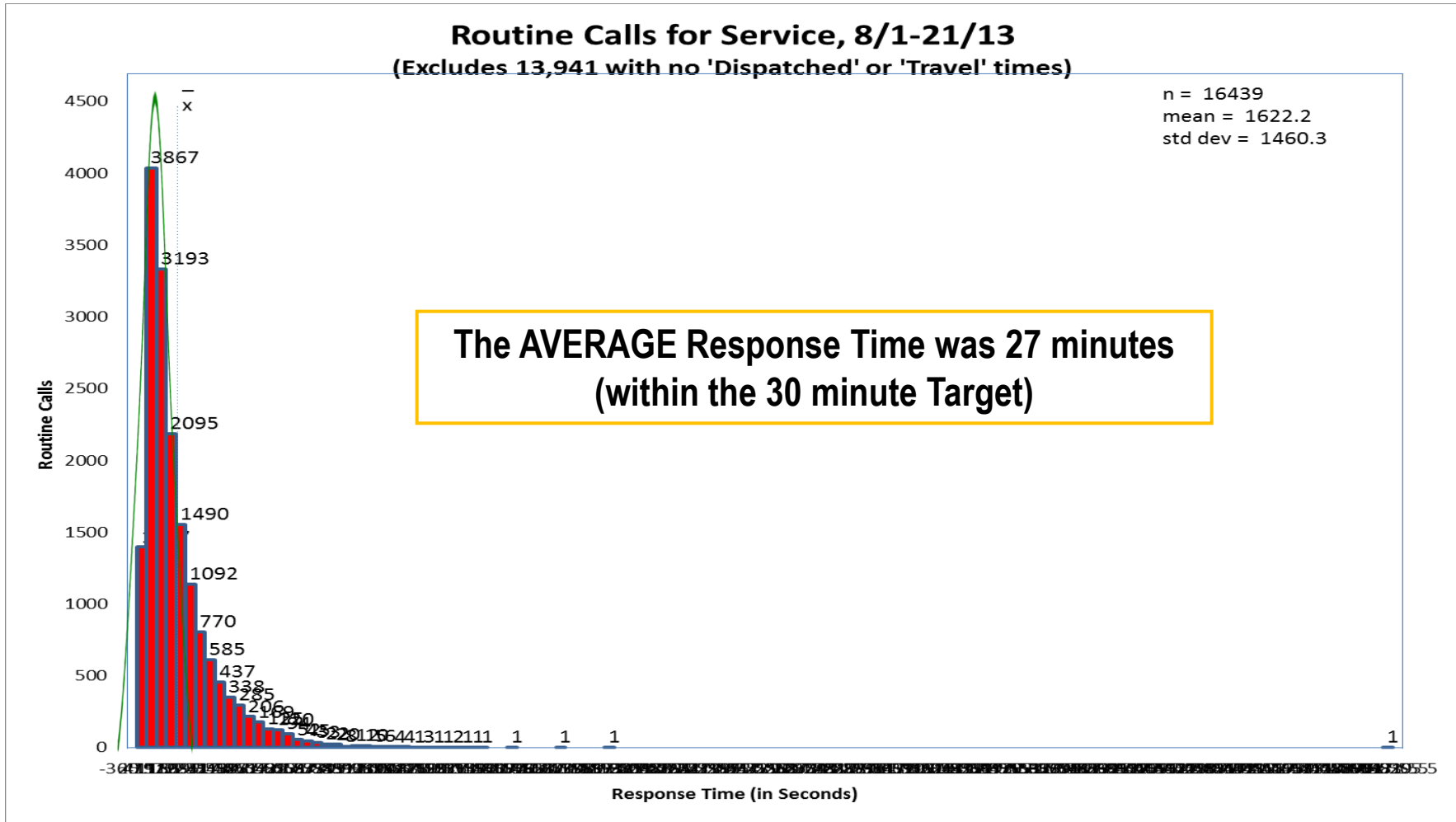


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Stratify the Problem

5. ✓

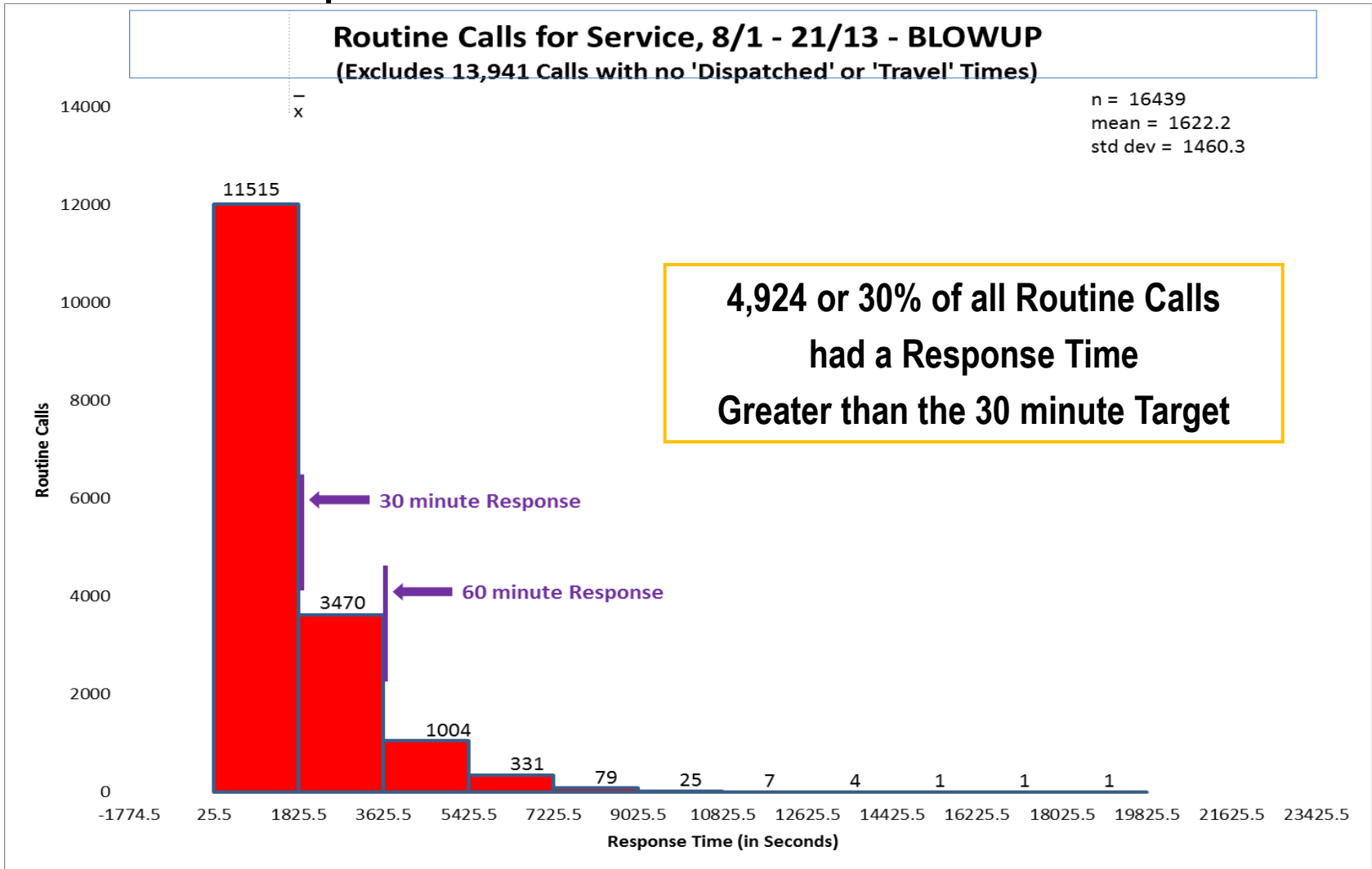
From the initial data collection of All Calls (33,243), the team removed Emergency/Priority Calls (2,863), as well as those with missing fields and no travel time (13,941), and then stratified the remaining data to “see” the variation in Response Times:



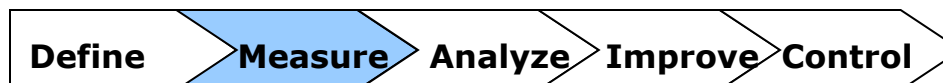
Stratify the Problem

5. ✓

A blowup view of the same information (16,439 Routine Calls) clearly shows the number of Late Response Calls..



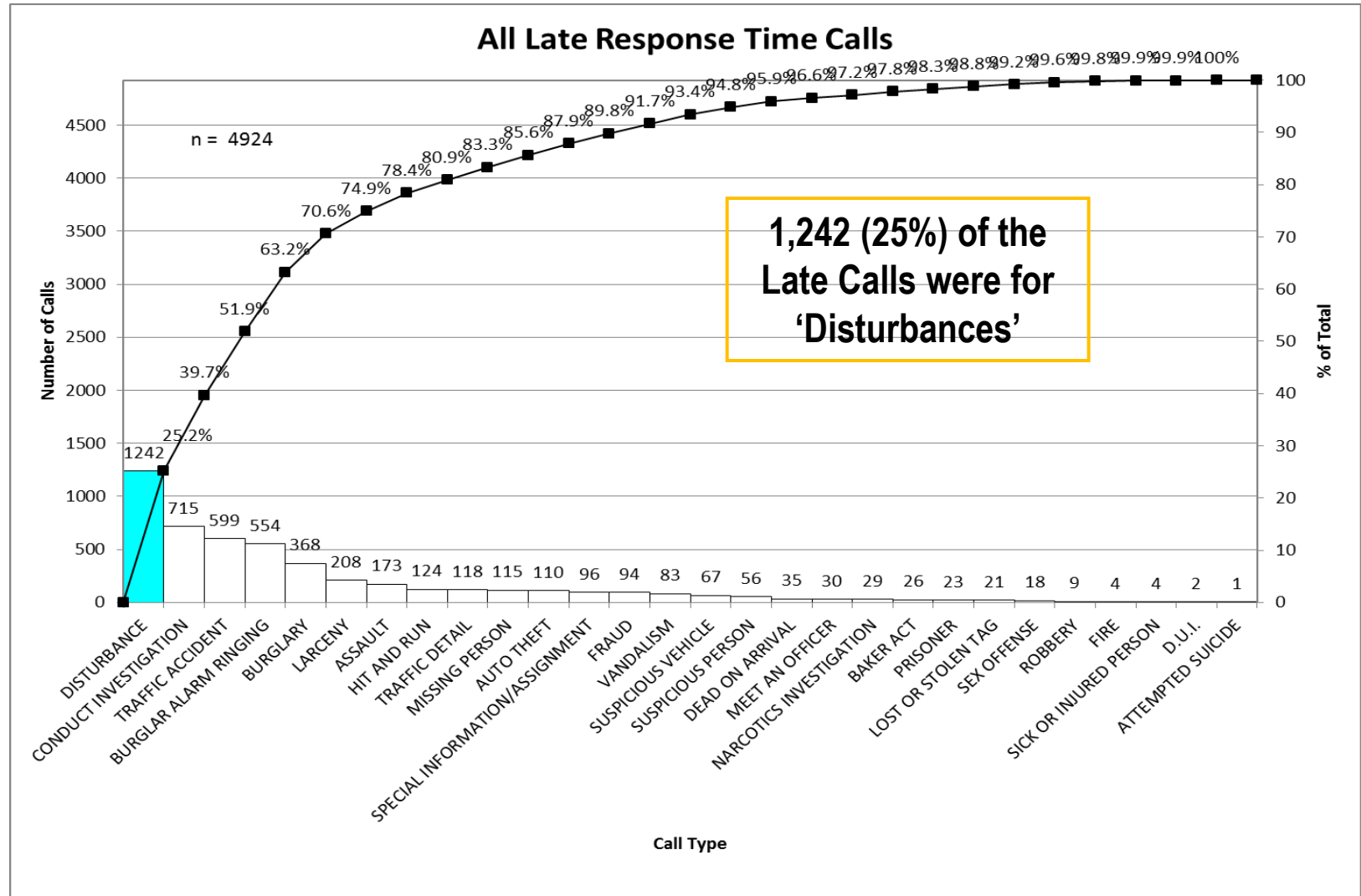
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Stratify the Problem

5. ✓

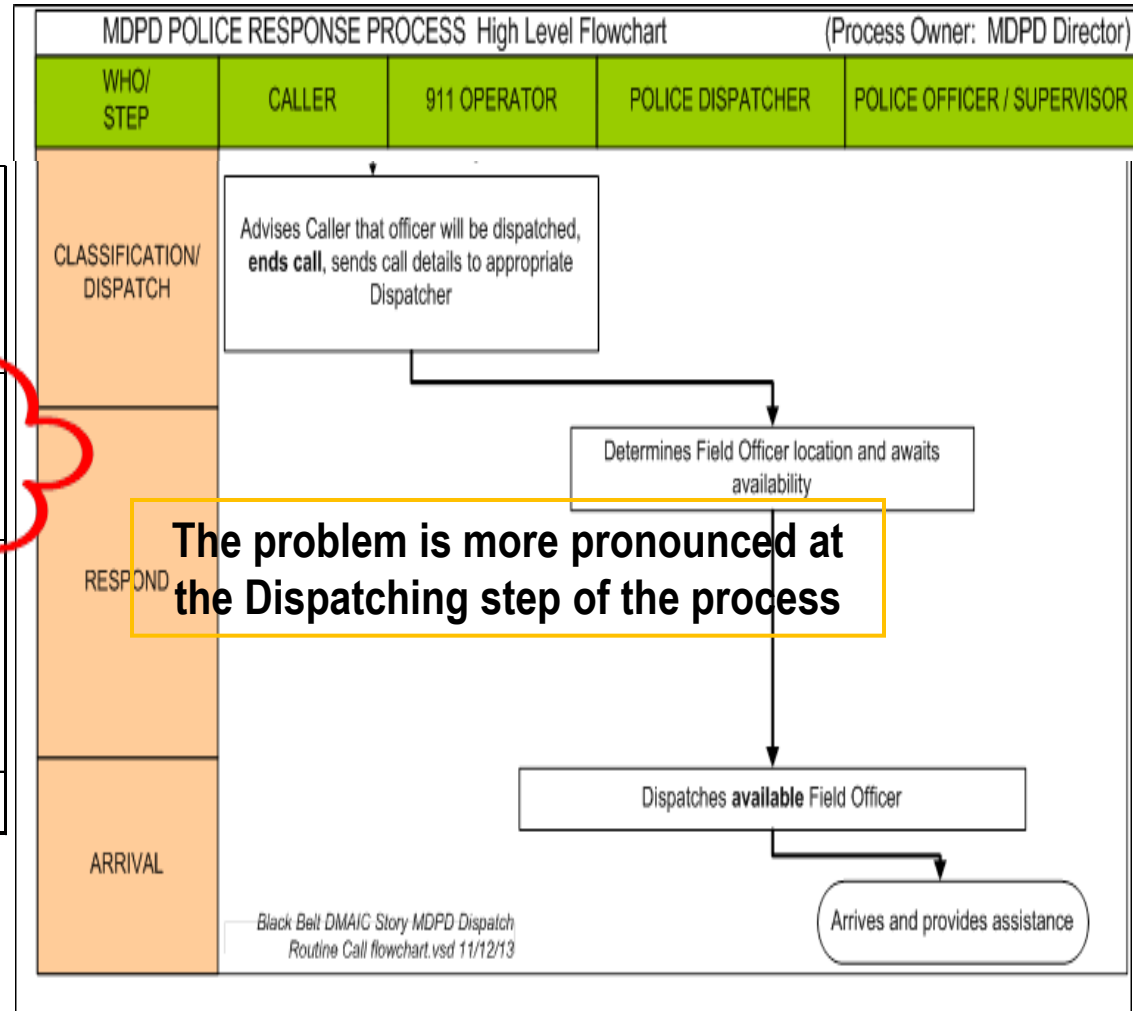
The team stratified the data many ways and found that, of the 4,924 Late Response Calls:



Stratify the Problem

The team compared the Timely Response to 'Disturbance' Calls against the Late ones and found:

	Timely 'Disturbance Response Time' (Dispatcher time)	Untimely 'Disturbance Response Time' (Dispatcher time)	Difference
(Dispatcher awaiting available officer)	381 Sec./ 6.35 Mins.	2,052 Sec./ 34.2 Mins.	28 Mins.
(Officer travel time)	525 Sec./ 9 Mins.	1,138 Sec./ 18.96 mins.	10 Mins.
Totals:	15 Mins.	53 Mins.	38 Mins.



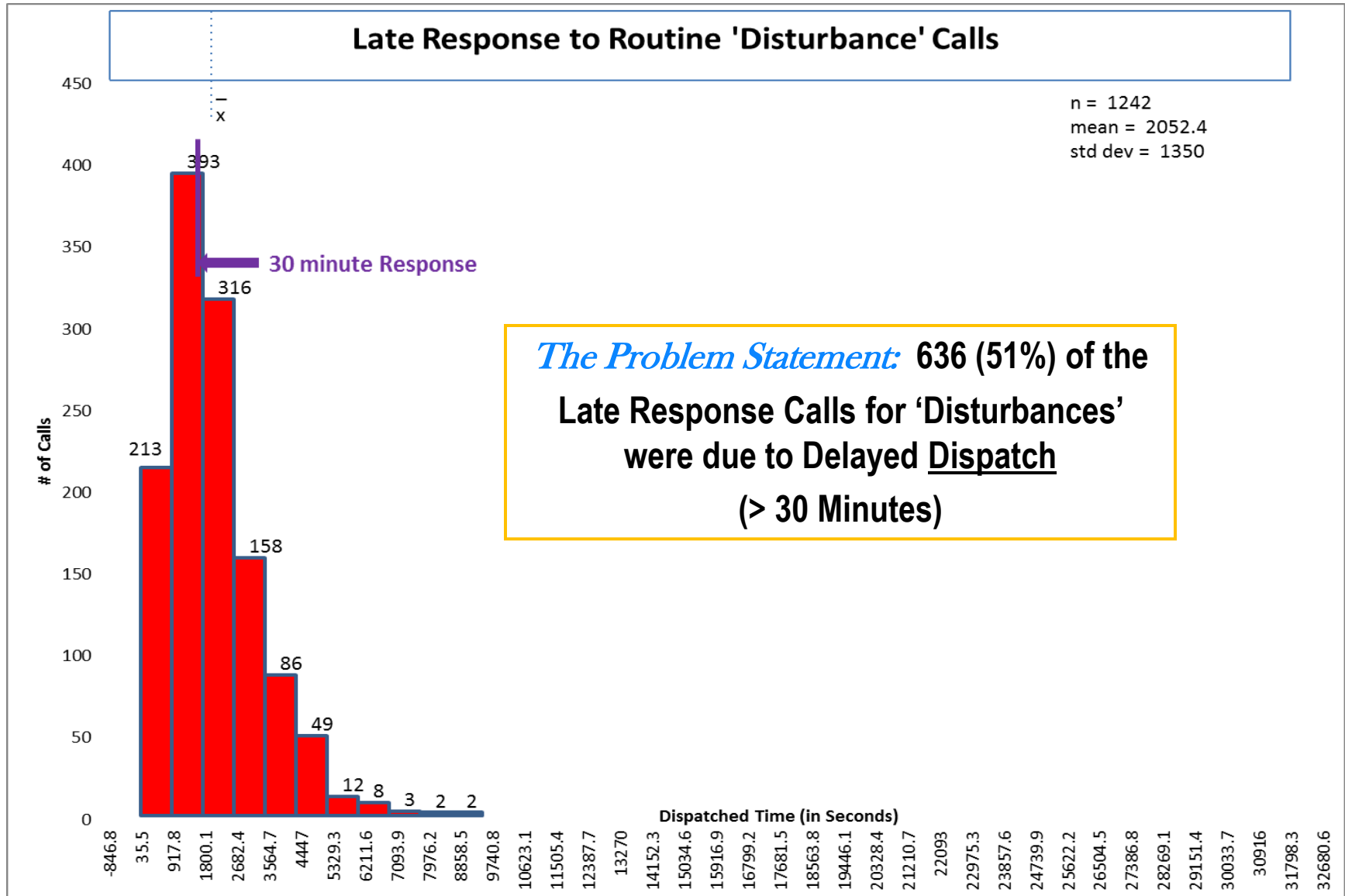
So the team looked more closely at the Late Response Calls to 'Disturbances' with a Late Dispatch (>30 minutes).

12



Stratify the Problem

Of the 1,242 Late Response Calls to Routine 'Disturbances', the team identified:



9 ☒

Problem Statement: *"636 (51%) of the Late Response Calls for 'Disturbances' were due to Delayed Dispatch (> 30 Minutes)"*

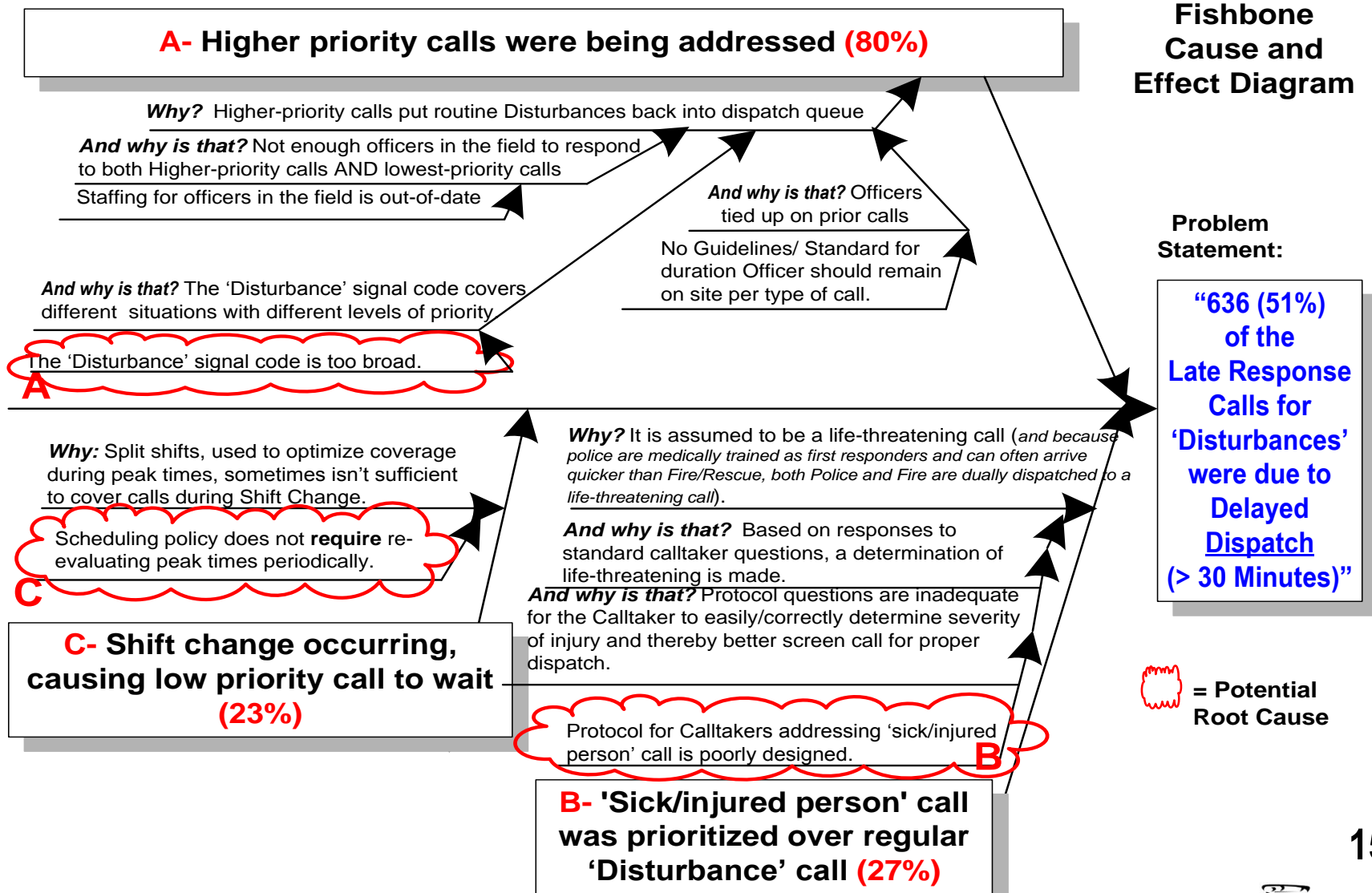
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14



Identify Potential Root Causes – fishbone.

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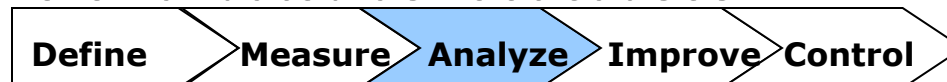


The team collected data to verify the root causes and found....

Root Cause Verification Matrix

Potential Root Cause	How Verified?	Root Cause or Symptom
A 'Disturbance' signal code is too broad.	Team determined that different disturbance types, (loud party, domestic dispute, public dispute) have different priority levels, but are all categorized as disturbances.	Root Cause
B Protocol for 'Sick/Injured Person' call type needs to be enhanced to better capture facts to determine a "life threatening" sickness/injury before dispatching.	Team determined Communications Report shows S/I calls reported as routine, which may indicate police was not first responder/ did not complete report (due to victim evaluation after arrival)/ was cancelled before arriving.	Root Cause
C Scheduling policy does not require re-evaluating Peak Times periodically.	In discussions with police staff, Team Lead determined that not all districts consistently consider peak times when preparing shift bids.	Root Cause

...all three (3) were validated as root causes.



Countermeasures Matrix

13, 14 

Countermeasures Matrix							Revised 2/20/14	
Problem Statement	Verified Root Causes		Countermeasures	Legend:				
				3=Moderately				
				5=Extremely 2=Somewhat				
				4=Very 1=Little or None				
				Ratings				
Effectiveness	Feasibility	Overall	Take Action? Yes/No					
“636 (51%) of the Late Response Calls for ‘Disturbances’ were due to Delayed Dispatch (> 30 Minutes)”	A -'The 'Disturbance' signal code is too broad.	A -	Separate out Loud Noise complaints from the 'Disturbance' Call type in order to track the impact of this type of call to the workload. Once known, develop more effective service delivery response for this type of call.	5	5	25	Y	
	B – Protocol for Calltakers needs to be enhanced to help gather better facts to determine a “life threatening” sickness/injury before dispatching -- thereby avoiding dual dispatching.	B -	Add/Clarify Language and Train Call Operators to better determine the severity of Sick/Injured Person in order to avoid dual dispatching (Police & Fire) if the victim's injury is not life threatening. Dispatch police only if life threatening injury (blood "spurting") or "AED" required.	5	5	25	Y	
	C - Review of Peak Times on Calls-for-Service is out of date.	C -	Require District Commanders to evaluate district peak times <u>periodically</u> , and then consider rebalancing manpower as the workload demands.	4	2	8	Y	



Other Ideas Considered:

Other Suggestions:

Other Suggestions:						
Countermeasures	Legend:				Revised 3/13/14	
	5=Extremely		3=Moderately			
	4=Very		2=Somewhat			
	1=Little or					
	Ratings					
	Effectiveness	Feasibility	Overall	Take Action? Yes/No		
Separate 'Conduct Investigation' signal code into other more specific codes by priority, in order to better track their occurrences.	5	5	25	Y		
Implement limitations on what types of investigations/signals require physical appearance by a police officer, requiring the others be reported online, in-person or via phone, to appropriate staff.	5	4	20	Y		
Revisit the Standard Operating Procedures and adjust the service delivery methods (up or down) based on minimum staffing levels.	5	1	5	N	(this could mean adjusting what an officer does on site (issue simple police report # with basic required fields vs. a full-blown report writing. Basically, develop short-cut procedures for times when we're short-staffed (without impairing the process.) Team feels doing things differently accross districts isn't feasible. Municipal SOPs possibly affected as well.	
Limit the types of Burglar Alarm Ringing signals we respond to. No perimeter, motion, unmonitored calls without additional warranting circumstances. (see next slide for discussion)	5	1	5	N	Team felt b/cuz our ordinance requires registration-- registrants expect service.	
Consider modifying Burglar Alarm Ordinance by increasing registration and/or annual renewal fee and restructuring fines schedule.	5	4	20	Y		
Dispatch only 1 unit for routine Burglar Alarm Ringing signals, with Backup only if necessary.	5	1	5	N	A back-up is always needed. It is better to have someone with you if needed.	



Burglar Alarm Ringing:



MIAMI DADE POLICE DEPARTMENT
CAS Signal Summary Count - 109
Incident Date Range: Jan 1, 2013 - Dec 31, 2013

Signal	TOTAL CASES	REPORTED	NO REPORT
TOTAL CASES	46,429	39,113	7,316

= Over 46,000 2-unit dispatch,
false alarms annually!

Registration -

FAMIS GUI - Citrix Receiver

Miami-dade County 5.1 Online Famis System

File Edit Options

SELECT Worksheet Print All

FAMLS450 - Organization Summary Inquiry

Balance: Yearly Period: Currency Code:

Fiscal Month/Year: 12 2013

Index Code: PDR123710 False Alarm Registration

Organization:

Char/Object

Fdp/Fund/Sind

Project/Proj Dtl

Grant/Grant Dtl

User Code:

Subobj	Description	Budget	Actual	Encumbered	Balance
R34190	OTHER GENERAL GOVE	432,300	508,026		75,726
	REVENUE TOTAL	432,300	508,026		75,726
	REVENUE LESS EXPE	432,300	508,026		75,726

\$508,026 (\$25 registration each new alarm or renewal year) = Over 20,321 alarms registered annually.

Fines -

FAMIS GUI - Citrix Receiver

Miami-dade County 5.1 Online Famis System

File Edit Options

SELECT Worksheet Print All

FAMLS450 - Organization Summary Inquiry

Balance: Yearly Period: Currency Code:

Fiscal Month/Year: 12 2013

Index Code: PDR123720 False Alarm Fines

Organization:

Char/Object

Fdp/Fund/Sind

Project/Proj Dtl

Grant/Grant Dtl

User Code:

Subobj	Description	Budget	Actual	Encumbered	Balance
R34190	OTHER GENERAL GOVE	900	2,541		1,641
	REVENUE TOTAL	900	2,541		1,641
	REVENUE LESS EXPE	900	2,541		1,641

Less than 50 alarms pay a fine annually (have 4 or more false alarms annually.)



Identify Barriers and Aids

15. 

The team performed Barriers and Aids analysis on the selected Countermeasures.

Barriers			Aids	
Impact (H, M, L)	Forces Against Implementation		Forces For Implementation	
H	A)	Resistance to institutional change <i>(Supported by Aids A1 and A2)</i>	A1)	Could lead to revised SOPs (priority level change), resulting in better response time overall.
			A2)	Mngt. very supportive of team's effort to find efficiencies.
H	B)	Protocol may be nationally regulated. <i>(Supported by Aid B)</i>	B)	Screening procedure already in place, albeit weak.
H	C)	Concerns from mid-management regarding timeliness of trend data. <i>(Supported by Aid C)</i>	C)	Needed report currently available, and some districts already do this.

The team next sought to incorporate this analysis into their Action Plan.

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Develop and Implement Action Plan

16. 

The team implemented an Action Plan for their Countermeasures.

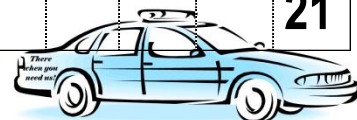
WHAT: Implement countermeasures to Increase the % of Time Routine Calls are Responded to within 30 Minutes.

HOW		WHO*	2014											
			Mar	Apr	May	June	July	Aug	Sept	Oct.	Nov.	Dec.		
A	Separate out Loud Noise complaints from the 'Disturbance' call type, in order to track the impact to the workload. Develop a more effective service delivery response for this type of call.	MDPD												
O1	Separate 'Conduct investigation' signal code into other more specific codes by priority, in order to better track their occurrences.	MDPD												
O2	Implement limitations on what types of Investigations/signals require physical appearance by a police officer, requiring the others be reported online, in-person or via phone, to appropriate staff.	MDPD												
B	Add/Clarify Language and Train Call Takers to better identify the severity of Sick/injured Person prior to dual dispatching (police and fire) call.	MDPD												
C	Require (Implement) District Commanders to evaluate district peak times periodically, and consider rebalancing manpower as the workload demands.	Director Patterson												
O3	Pursue modifying Burglar Alarm Ordinance by increasing registration and/or annual renewal fee and restructuring fines schedule.	MDPD												
1	Train Police Officers and Call Takers in procedural changes resulting from 'Disturbance' review above (Countermeasures A & O1).	MDPD												
2	Implement Countermeasures A and B.	MDPD												
3	Review results of Countermeasures A, O1 & B and Adjust as needed.	BBTeam/ MDPD												
4	Incorporate final Countermeasures into ongoing operations.	MDPD												
5	Develop Resource Staffing/Balancing model.	OMB/MDPD												

Legend:
 = Actual
 = Proposed

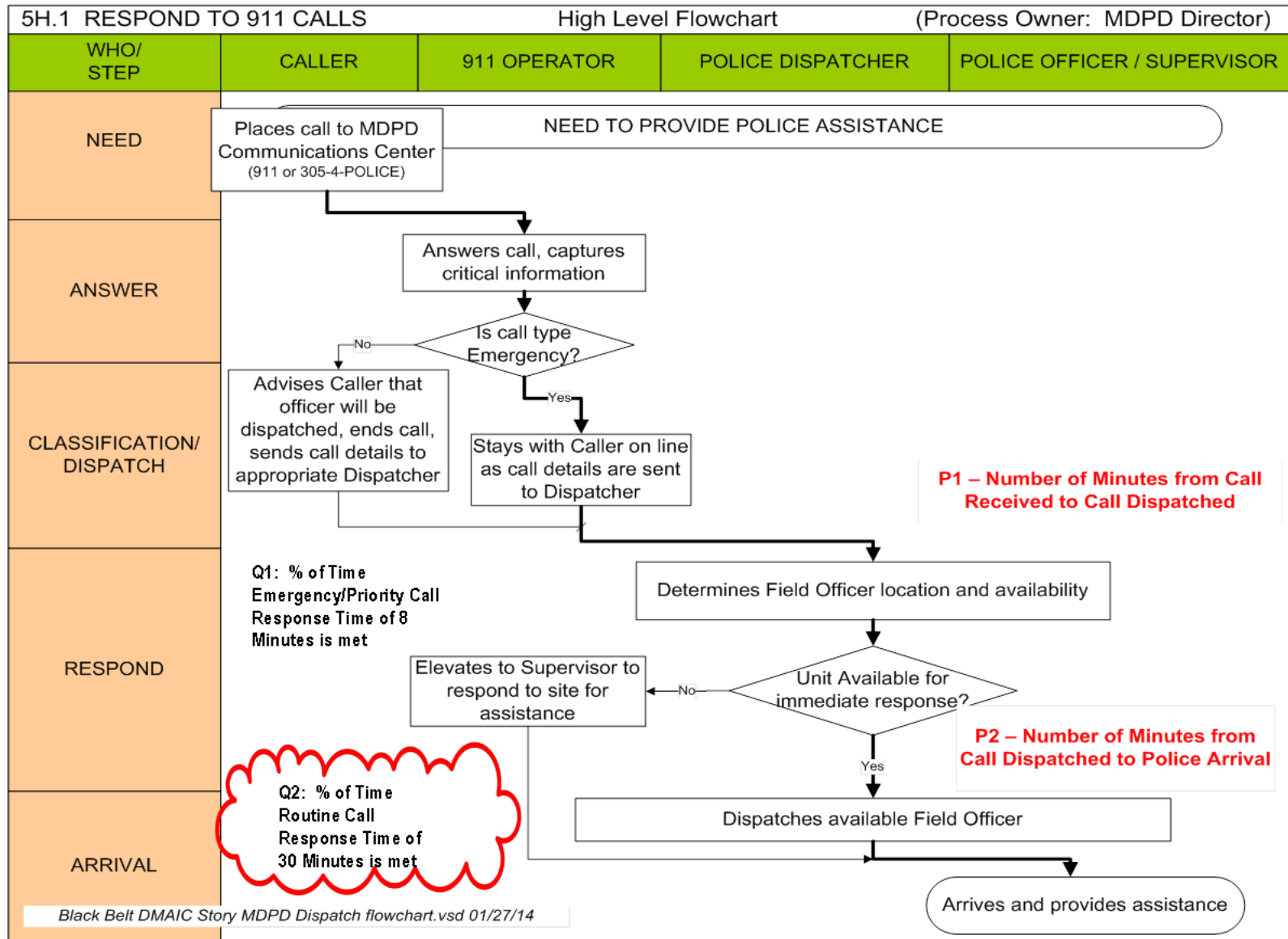
Last edited 3/20/14.

Define Measure Analyze Improve Control



Standardize Countermeasures

The team included the proposed Flowchart in their Process Control System.



Standardize Countermeasures

and completed a Process Control System (PCS) Form.

Process Control System						
Process Name: Increase % of Time Routine Call Response Time of 30 Minutes is met				Process Owner: Miami-Dade Police Department		
Process Customer: Miami-Dade County Residents				Critical Customer Requirements: Increase % of Time Routine Calls are Responded to within 30 Mins.		
Process Purpose: Improve Response Time				Current Sigma Level: TBD		
				Outcome Indicators: Q1, Q2		
Process and Quality Indicators			Checking / Indicator Monitoring			
Process Indicators	Control Limits	Data to Collect	Timeframe (Frequency)	Responsibility	Contingency Plans / Misc.	
And					<ul style="list-style-type: none"> • Actions Required for Exceptions • Procedure References 	
Quality Indicators	Specs/ Targets	What is Checking Item or Indicator Calculation	When to Collect Data?	Who will Check?		
P1 Number of Minutes from Routine Call Intake to Call Dispatched	1 Min.	'Call Dispatch[ed] Time' - 'Complaint Datetime' -	Monthly	Admin.	Discuss situation to determine reason for shortfall & action plan.	
P2 Number of Minutes from Routine Call Dispatched to Officer Arrival	15 Mins.	'First Arrival Datetime' - 'Call Dispatch[ed] Time'	Monthly	Admin.	Discuss situation to determine reason for shortfall & action plan.	
Q1 % of Time Emergency Call Response Time of 8 Mins. is met	8 Mins.	'# of Emergency/Priority Calls' / '# of Emergency/Priority Calls with Response Time Less than or equal to 8 mins.'	Qtly.	Admin.	Review with district supv. to determine action plan.	
Q2 % of Time Routine Call Response Time of 30 Mins. is met	78%	'# of Routine Calls' / '# of Routine Calls with Response Time Less than or equal to 30 mins.'	Qtly.	Admin.	Review with district supv. to determine action plan.	

Approved:

Date:

Rev #:



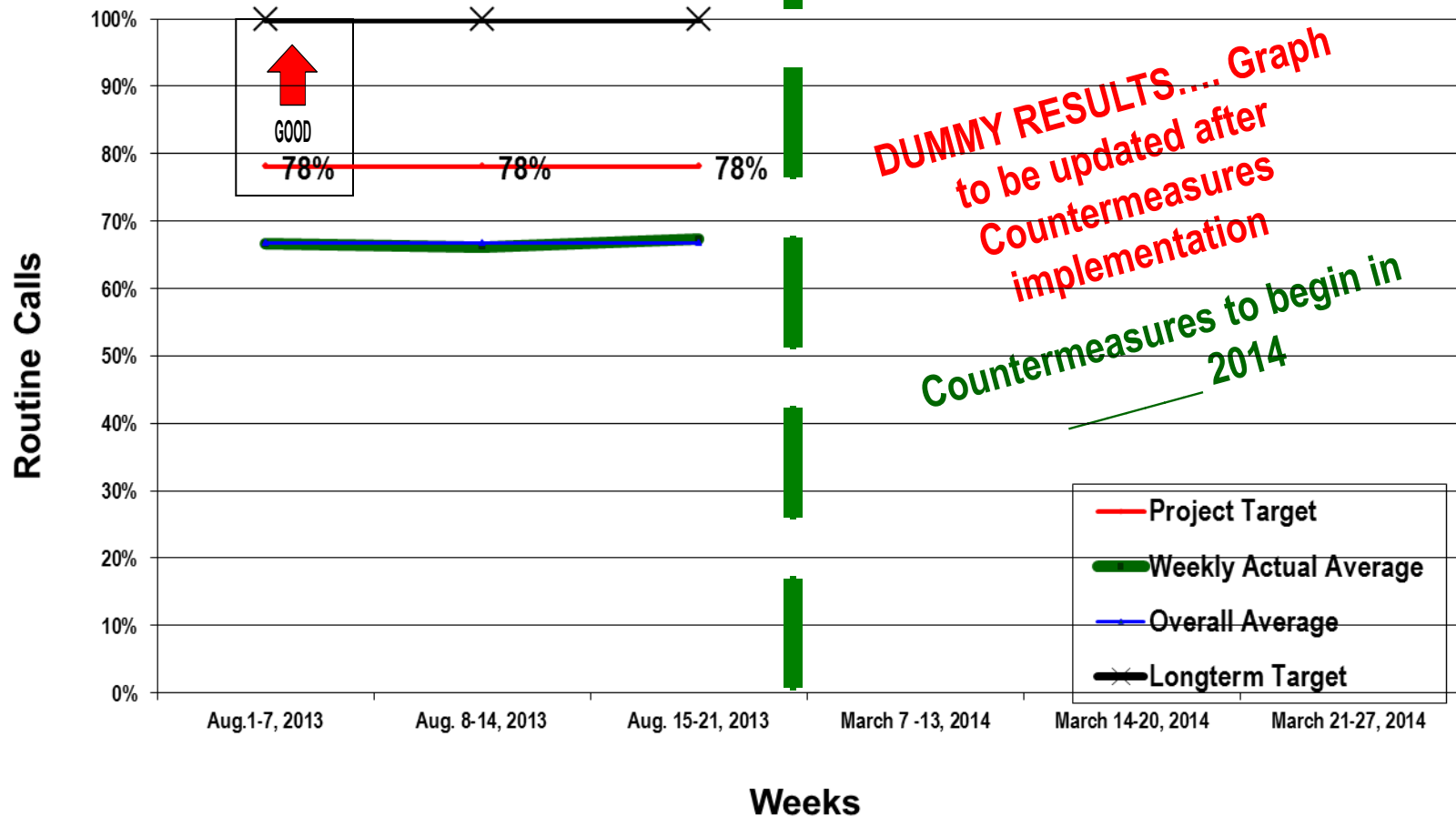
Review Results

17.,18.,19.,20. ✓

The team will continue to track indicator data and then review countermeasure results.

Q2 - % of Time

Routine Call Response Time is within 30-Minutes



Lessons Learned

- 1) **Data collection is crucial to good problem solving.** Consider capturing whether First Responder OR Backup Unit was not available (so countermeasures could address a fix for it).
- 2) **Data stratification was very important** *as it points the team to areas of highest impact.*
- 3) **Root cause identification is essential** *in order to ensure countermeasures will affect/improve performance*
- 4) **Creative Thinking techniques were valuable** *in identifying countermeasures for the team to evaluate.*
- 5) **When evaluating countermeasures, the most effective is not always the best countermeasure** *since feasibility must also be considered.*

Next Steps

- Monitor implementation Schedule of Countermeasures
- Monitor Routine Response Time monthly to ensure Countermeasures are working positively

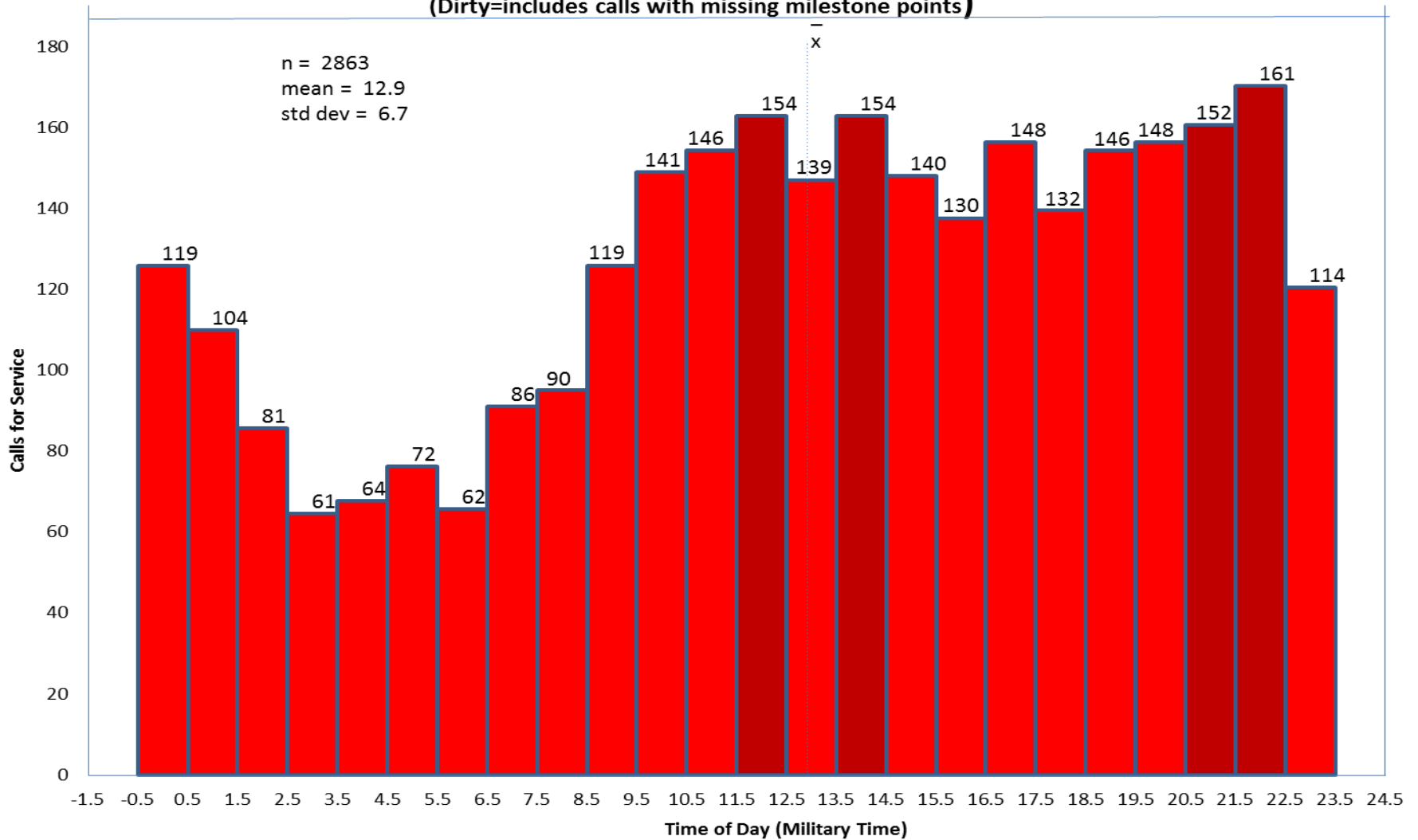


APPENDICES:



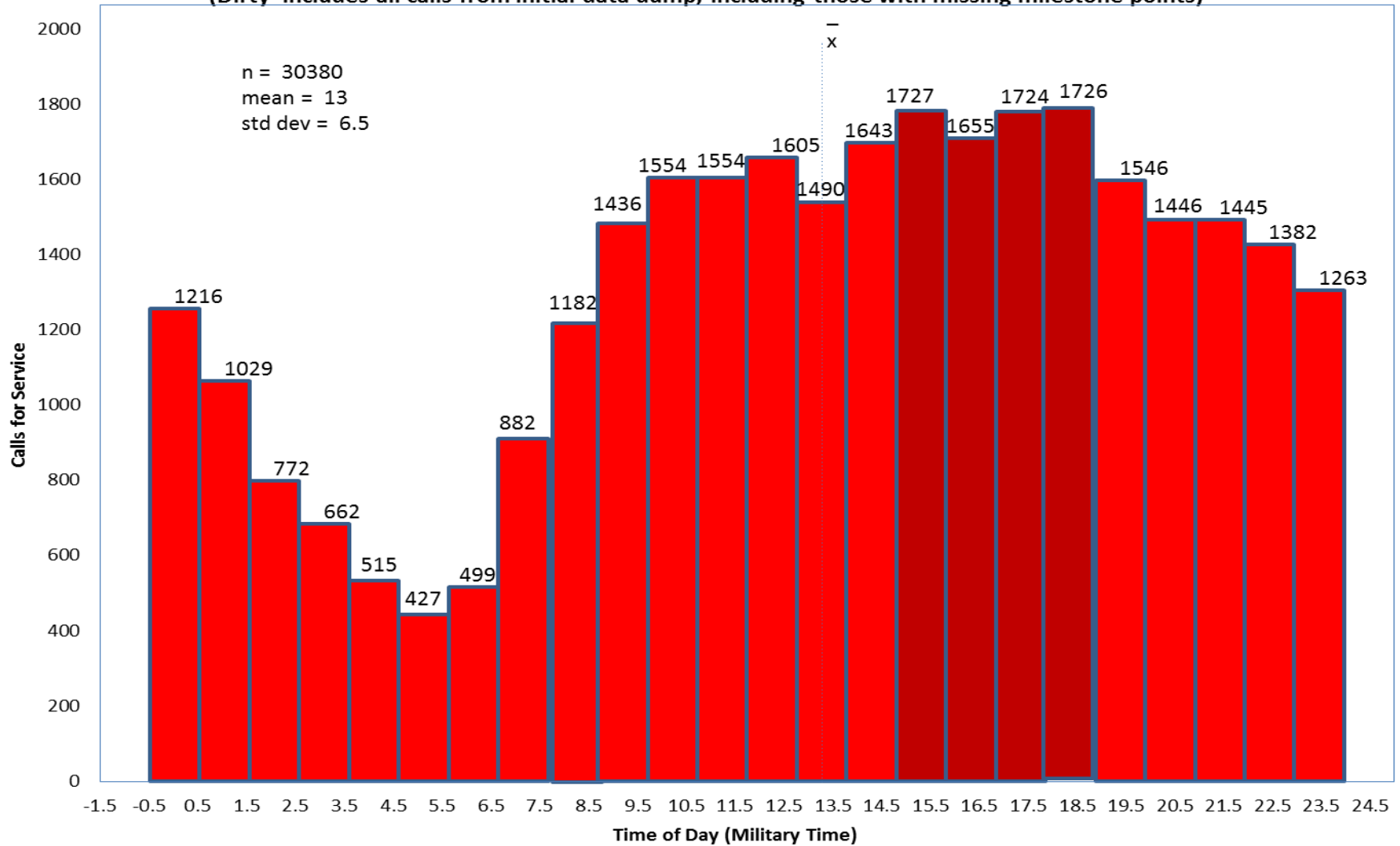
All EMERGENCY/PRIORITY Calls (dirty)

(Dirty=includes calls with missing milestone points)



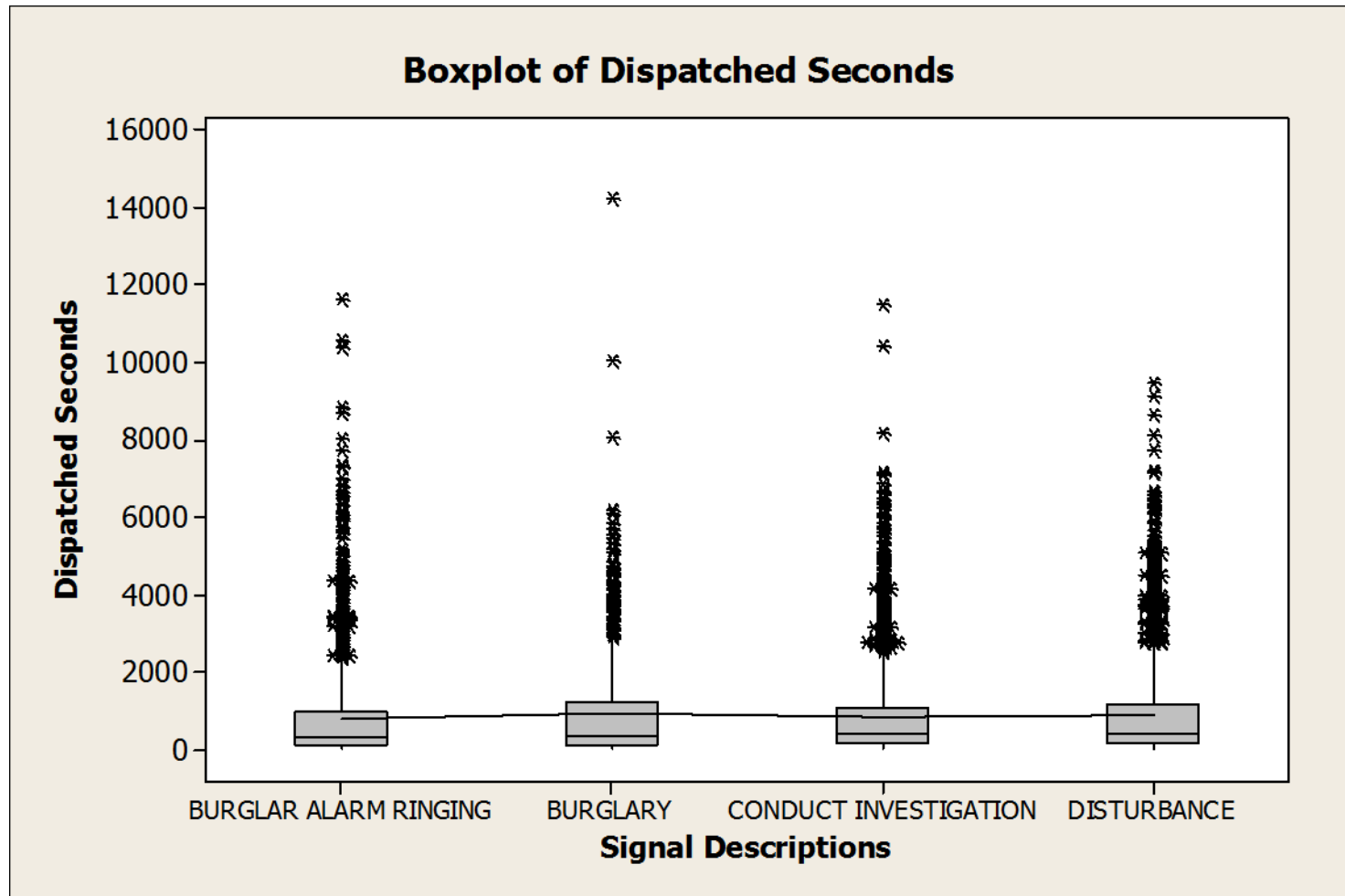
All ROUTINE Calls for Service (dirty)

(Dirty=includes all calls from initial data dump, including those with missing milestone points)



Root Cause Verification

A statistical test performed shows that more Signal Types have delayed dispatch times.

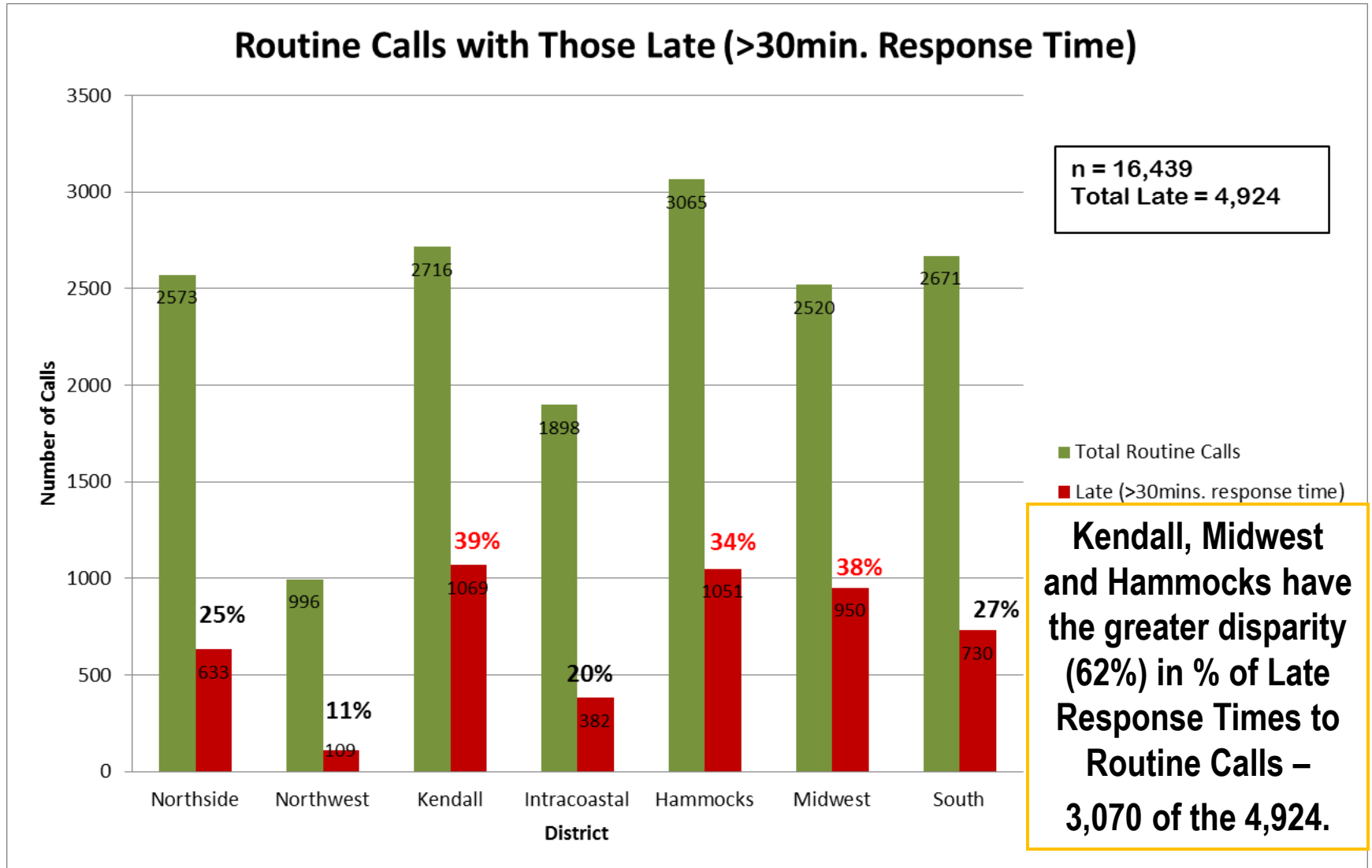


This indicates that although Disturbances have the most number of delayed dispatches, the problem extends beyond just this type of Service Call.



Stratify the Problem

The team compared call volume to # of late responses, to identify which Districts were affected, and found:



Define

Measure

Analyze

Improve Control

